FCC Ex Parte Presentation
CC Docket No. 94-102
October 24, 2002

EOTD Industry Forum & EOTD Handset Taskforce

History

- Location Working Group formed by operators (May 2002) – identified need for collective action among operators and vendors
- EOTD Industry Forum formed in July 2002 (9th July)
- Leaders of E911/LBS programs - Infrastructure vendors
- Chairman: Lennart Edberg, Ericsson
- Business management and technical experts from
  - Ericsson
  - Nokia
  - Nortel
  - Siemens
  - CPS (invited and joined the forum mid-July 2002)
- Purpose:
  - Joint industry effort to fulfill FCC E911 requirements
  - Joint industry effort that works together with the operators ensuring up-to-date information to FCC regarding the ability and consequences of fulfilling the FCC requirements 2002 and 2003

EOTD Industry Forum & EOTD Handset Taskforce

EOTD Handset Taskforce formed in July 2002

- Participants:
  - Motorola (Yasser Nafei, Chairman)
  - Siemens
  - Nokia
  - SonyEricsson
  - Samsung
  - Panasonic
  - NEC
  - CPS
- Aligned with EOTD Industry Forum
  - Joint preparations and presentations at Carrier/CTO meetings

EOTD Industry Forum & EOTD Handset Taskforce

EOTD Industry Forum Statement 25 July 2002 to AT&T, Cingular and T-Mobile

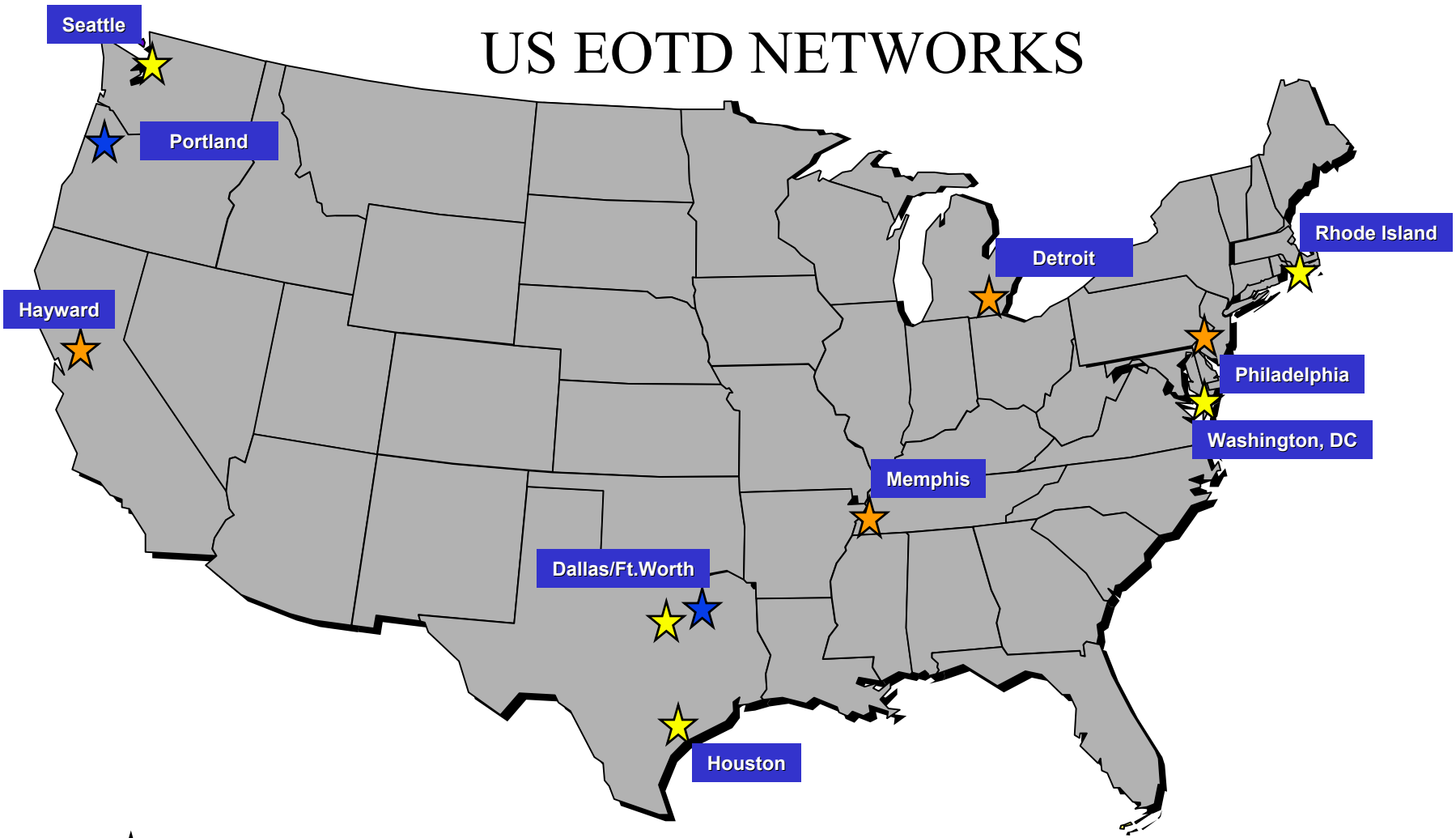
"Based on the recent and newly shared EOTD Field Trial results and the areas that have already been identified for improvements, the joint EOTD Industry Group believes that the EOTD community, with focused efforts from infrastructure vendors, terminal vendors and carriers, should meet the FCC's 2003 requirements."

EOTD Industry Forum & EOTD Handset Taskforce

Current Status

- EOTD technology has demonstrated that it can meet 2002 requirements
- Have addressed carrier's biggest concern
  - Placement of antennas on towers
  - New base stations/beacon sites only required in exceptional cases
- Addressing deployment issues (speed to market)
  - Pleasanton configured in 4 days
  - Memphis configured and data captured in 2 weeks
  - Absolute Time in Portland installed in days
- Analysis tools are catching up
- 2003 plans established, supported by all vendors, and reviewed with all participating carriers
  - Accuracy plans in place
  - Interworking
  - End to end performance

EOTD Industry Forum & EOTD Handset Taskforce



EOTD Industry Forum & EOTD Handset Taskforce

Best Handset results	Hayward (Ericsson & Motorola V60)	Portland (Nokia & Nokia 6590)	Detroit (Siemens & Nokia 3395)	Denton (Nortel & Samsung R225)
Test Points	150	50	150	41
Description of Environment	Suburban	Suburban	Suburban	Suburban
Number of Sites	20	29	28	22
Number of test points	150	50	150	41
Test Calls Per Test Point	7	10	5	8
Total Number of calls	1055	509	692	328
67% Percentile (E-OTD ONLY)	**88**	**116**	**90**	**95.4**
95% Percentile	**232**	**335**	**264**	**203.6**
%<100m	**73**	**58.0%**	**71.6**	**70.5%**
%<300m	**97**	**94.0%**	**96.1**	**97.5%**
Yield	**88**	**97.6%**	**87.9**	**98.5%**
67% (E-OTD& CGI/TA fall back)	92	117	108	97.1
95% (E-OTD& CGI/TA fall back)	459	348	1338	263.6
Yield (E-OTD& CGI/TA fallback)	91	100.00%	87.9	100.00%
67% Percentile (all calls)	107	117	109	97.1
95% Percentile (all calls)	*	348	1452	263.6
Comments	* >5% without value			

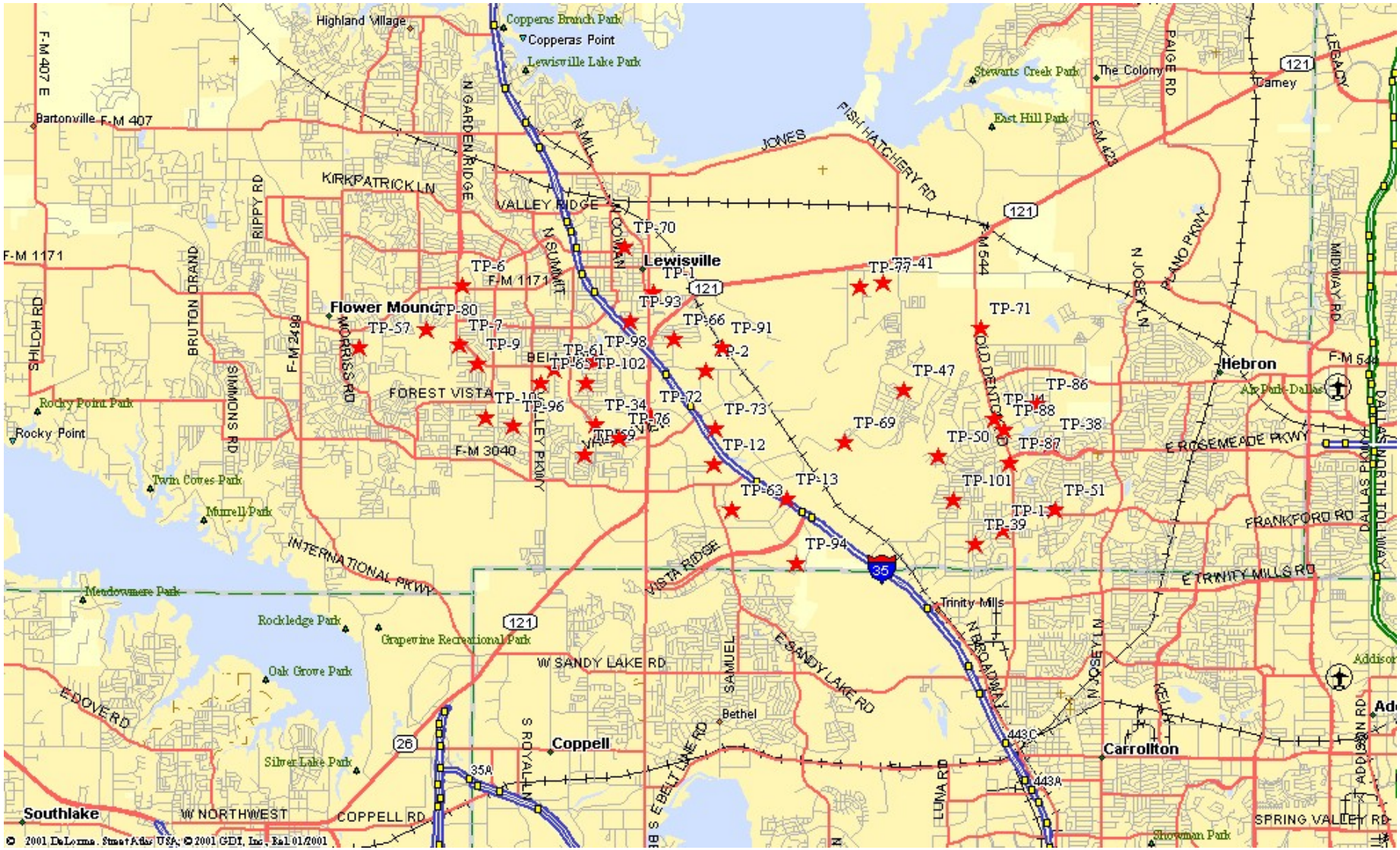
EOTD Industry Forum & EOTD Handset Taskforce

Performance and Yield Issues- Current

• Hayward	
– Inter MSC Handovers	Fix ready for test
– Inter BSC Handovers	Fix ready for test
– Mobile terminated LocReq timeouts	Test application issue
• Portland	
– Intra BSC Handovers	Correcting assistance data
• Detroit	
– LocReq timeouts	Tuning BSC/SMLC timers
– Poor BCCH visibility	Expand BA list & adding assistance data
– Inter BSC handovers	Under investigation
• Denton	
– ClassMark 3	Out of Bounds BTS
– MS protocol error	Reported to MS vendor
– BSC handovers	Fix being prepared

EOTD Industry Forum & EOTD Handset Taskforce

Denton EOTD Test Area – over 160 sq km



EOTD Industry Forum & EOTD Handset Taskforce

Accuracy per handset type: Denton EOTD Target TPs (RTD only)

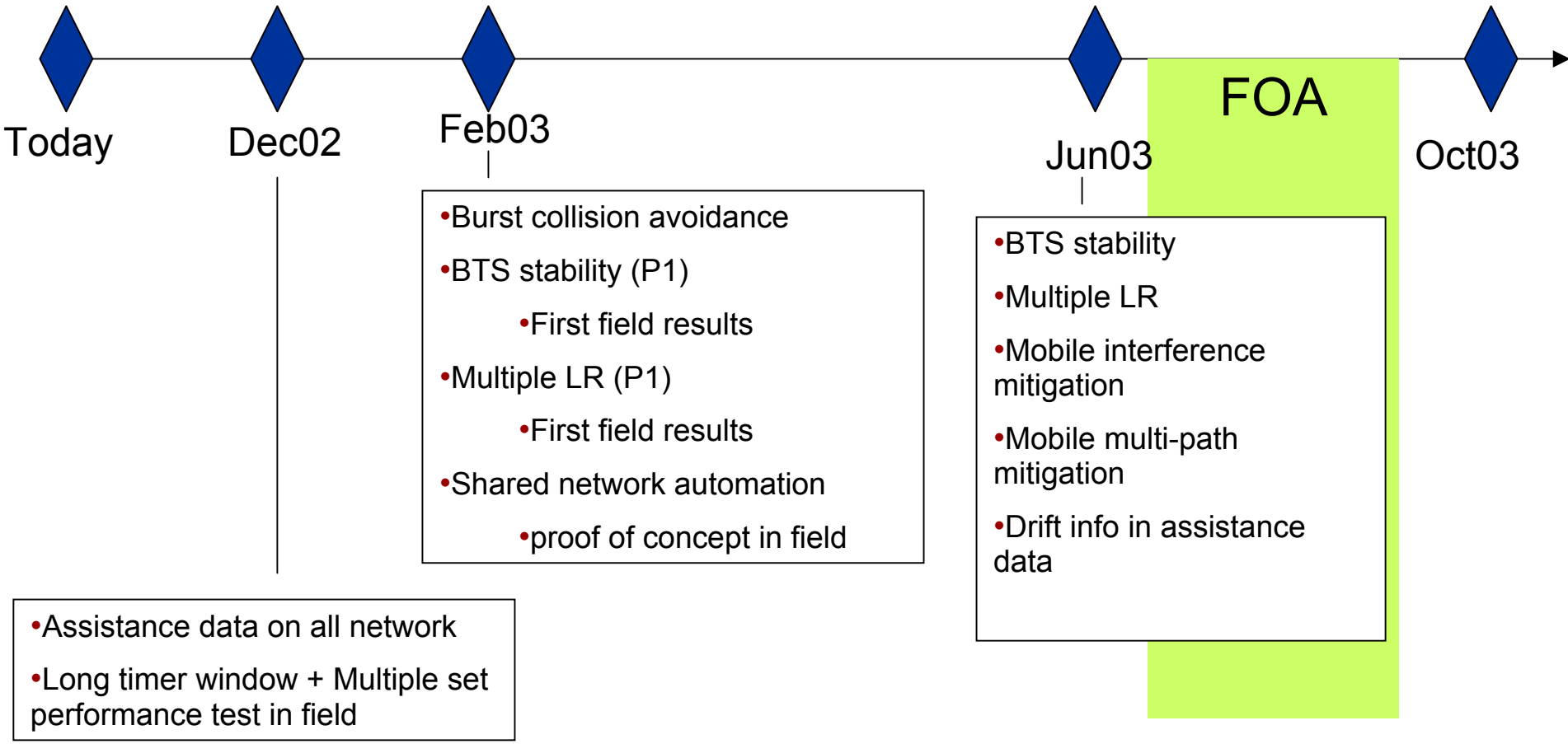
Handset Manufactur, Model and S/W Version	Nokia 3390 3.01	Samsung R225 VVH2	All Phones Combined
Test Points	ALL	ALL	ALL
Description of Environment	Suburban / Residential		
Number of LMU Sites	22		
Number of test points	41	41	41
Test Calls Per Test Point	8	8	16
Total Number of calls	325	328	653
67% Percentile (E-OTD ONLY)	**103.9**	**95.4**	**99.5**
95% Percentile	**200.6**	**203.6**	**202.0**
%<100m	**64.1%**	**70.5%**	**67.3%**
%<300m	**98.9%**	**97.5%**	**98.1%**
Yield	**97.5%**	**98.5%**	**98.0%**
67% (E-OTD& CGI/TA fall back)	106.1	97.1	101.8
95% (E-OTD& CGI/TA fall back)	232.9	263.6	250.3
Yield (E-OTD& CGI/TA fallback)	100.0%	100.0%	100.0%
67% Percentile (all calls)	106.1	97.1	101.8
95% Percentile (all calls)	232.9	263.6	250.3
Comments	Failures: - ClassMark3: location request on BTS with ClassMark3 not activated - Protocol error: due to BSC Handover or handset sw issue		

Accuracy Improvements

- Short term (75/225) Q1/03
  - Yield improvements (multiple measurements, expected OTD, bad hyperbolic detection)
  - Assistance data (in all markets)
  - Bug fixing
- Medium term (50/150) Q3/03
  - BTS clock stability
  - Interference mitigation
  - Optimal OTD measurements
    - Subsequent RRLP requests
- FOA for (50/150) Q3/03
  - July/August 2003
- Joint industry efforts will continue

EOTD Industry Forum & EOTD Handset Taskforce

EOTD Industry Forum and Handset Task Force Plan



EOTD Deployment Improvements

- Use Absolute time (AT) feature
- 1:1 LMU/BTS Ratio
- Antennas are internal or shelter mounted with very few exceptions.
  (Verified in: Portland, Hayward, Dallas, and Denton)
- Effective site survey and data capture process very important.
- New base stations/beacon sites only required in exceptional cases:
  - All current results have been achieved with existing sites.
  - RF design proposal for Bay area and Seattle shows no need for additional BTS's.

EOTD Industry Forum & EOTD Handset Taskforce

Impact of Multiple E-OTD Location Requests during the E911 call

- Performance assessed from
  - Actual field data (OTDS, LMU timings etc)
  - Simulated effect of incorporating additional measurements into calculation
  - SCH timing correlation time estimated to be less than 2-3 seconds
- From Detroit (Siemens/Cingular) RTD September trial (CPS Analysis)

	Number of EOTD calculations	failures	within 67%	within 95%	< 50m	< 100m	< 150m	< 300m
SMLC baseline	2962	0	93.9m	271.5m	32.4%	69.5%	85.1%	95.5%
groups of 4 requests:								
each request separate	2380	0	94.9m	245.1m	31.8%	69.7%	84.7%	96.6%
2 requests combined	1190	0	75.1m	182.2m	44.5%	80.4%	92.5%	98.6%
4 requests combined	595	0	61.1m	148.7m	55.5%	87.4%	95.3%	99.2%

NSS/E-OTD Deployment Status

- All MSC and BSC software upgraded.
- Hardware upgrades to all 92 Nokia BSC completed to bring them to SMLC status.
- Five Nortel SMLCs installed in
  - Dallas, Detroit (2), Seattle, Connecticut.
  - Capacity for 3750 LMUs.
- Four Ericsson SMLCs installed and operational in:
  - Wayne, NJ (2); Atlanta, GA(2).
  - Capacity for 3000 LMUs.

T··Mobile·

NSS Phase 2 Completed Deployments

State	Market	County	EntityName
IN	Indianapolis	RIPLEY	Ripley Cnty Communications
IN	Indianapolis	MARSHALL	Marshall County Sheriff
IN	Indianapolis	WHITE	White County 9-1-1
IN	Indianapolis	FULTON	Rochester Police Department
IN	Indianapolis	KOSCIUSKO	Kosciusko County
IN	Indianapolis	STARKE	Starke County
IN	Indianapolis	ADAMS	Adams County
IN	Indianapolis	CLAY	Clay County E911 Office
RI	Rhode Is. (Boston)	RI- Multiple	Rhode Island E911

- Tippacanoe IN - almost complete.
- York Co., VA. Screen data issues
- Vigo, IN. Successful testing - market to do profile and field testing
- Anne Arundel Co., MD from our DC market. ESRK not getting out of the MSC. Retesting scheduled next week.
- . Brown Co MN - First deployment using flexible PAM response. Ready to begin testing.
- King Co., WA - waiting for S/R signaling to be resolved.
- Denton Co, TX – SBC to Verizon switch delayed,
- St Clair Co, IL - on going

T··Mobile·

E-OTD Deployment Status

- LMU Deployments started in:
  - Rhode Island State (Completed, EOTD live)
  - Houston (Harris Co)
  - Kansas City
  - Dallas (Denton Co, Tarrant Co)
  - Atlanta
  - Seattle
- 438 LMU installed
- 3600 LMU delivered and awaiting final software and internal coupling kits.
- Further 3000 awaiting delivery

T··Mobile·

Summary

- Industry has plans in place and believes 2003 requirements can be achieved.
- Hatfield Report:

  "The center of attention of the industry has clearly shifted from discovering, developing, evaluating, and selecting the ways of locating mobile units in wireless systems to integrating the location information into the existing E911 system."

  - T-Mobile has begun that integration.